

USA Appln. No. 09/022,336
Applicant: William E. M. Jones et al
December 3, 2001

REMARKS

Claims 7, 12, 14, 15 - 19, 22 - 25, 27 - 30, 33, 34, 36, 38, 40, and 42 are pending (claims 8, 9, 20, 21, 32, 35, 37, 39, and 41 have been withdrawn herein). New claims 43 - 49 have been added.

Interview.

The undersigned makes the following corrections and supplements to the interview summary form mailed 4/11/01 from the PTO.

The type of interview was personal between Examiner Maples and applicant's representative Gary Hecht. The interview summary form of 4/11/01 incorrectly notes that the interview was telephonic.

Applicant concurs generally with the examiner's record of the interview with some exceptions. The undersigned indicated in the interview that an RCE or CPA would likely be filed. The undersigned also stated that amendments to the claims were planned without prejudice to refiling the previous unamended claims in a continuation application.

The examiner requested that the claim for priority to the PCT application in the beginning of the application be amended to indicate the U.S. serial or patent number of the PCT application.

The undersigned stated that applicants would consider amending the claims to claim the hydrophobic element more specifically, the "Teflon piece" and "film" being but some of the possible amendments being considered.

Filing Receipt

The filing receipt mailed 8/30/2001 lists the CPA filing date as 5/23/2001. This is incorrect as the CPA was filed on April 17, 2001. The incorrect date of 5/23/2001 is the date that evidence of the filing of the CPA was faxed to the PTO after the undersigned was contacted by the PTO and told that they could not find the CPA request documents. Suitable correction is requested.

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Drawings

Proposed Figure 3 submitted herewith was changed to depict that only 10 mL per day of oxygen is being consumed by the corrosion reaction, generating only 20 mL per day of hydrogen of the 80 mL needed for the negative plate self-discharge reaction. This is disclosed in the originally-filed specification at page 10, lines 31-39. The corrections to Figure 3 conforms the drawing to the specification and do not introduce new matter.

Rejections

I. 35 USC 102(b) Rejections

A. Catylators. Claims 15 and 16 stand rejected under 35 USC 102(b) as being anticipated by Catylators Limited (CL). For the reasons set forth below, claims 15 and 16 as amended are believed patentable.

Claims 15 and 16 are directed to a device for recombining gases in a storage battery which includes a gas-permeable catalyst container, and "a gas-permeable hydrophobic solid film encasing said container."

CL discloses a catalytic device for recombining hydrogen and oxygen evolved from an accumulator cell and returning the water so formed to the electrolyte. The catalyst compound 1 is surrounded by a layer 2 of hygroscopic and anti-corrosive compound and an encapsulment 3. The encapsulment 3 is made of porous glass or ceramic material that will resist the entry of electrolyte but will permit the entry of gases. The entire capsule 3 may be coated or impregnated with a water-repellent substance such as silicon (page 1, lines 61-63).

CL does not disclose or suggest a gas-permeable hydrophobic solid film encasing the container, but instead discloses a coating or impregnation of the capsule with a substance such as silicon. Since an anticipation rejection requires that all elements be disclosed in a single reference, claims 15 and 16 are believed

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to be patentable over CL.

B. Marui et al. Claims 15, 17, 23, 40, and 42 stand rejected under 35 USC 102(b) as being anticipated by Marui et al. Marui teaches a gas recovery device for storage batteries. While Marui discloses a catalyst 8 in a container 21 (see e.g. Figure 3 of Marui), the bottom portion of the container is expressly taught to be water permeable (see Column 5, lines 15 - 17). Thus Marui does not teach, and in fact teaches away from, a hydrophobic encasement of the container. Claims 15, 17, and 23, all limited to a gas-permeable hydrophobic solid film encasing said container are thus believed to be patentable over Marui.

Claim 40 has been amended to include the following limitation: "means for making all portions of said container that are gas-permeable impermeable to any liquid water while permitting gas to pass through, said means including PTFE." Support for this amendment in means plus function form can be found at least in the specification on page 17, line 30 to page 19, line 2. Since Marui teaches away in that the container is to be permeable to water (along the bottom portion), claim 40 is believed patentable.

Claim 42, as amended, requires a PTFE gas-permeable hydrophobic solid material attached externally to and surrounding said container in a manner so as to prevent liquid water from passing through said container when said device is combined with said storage battery. As discussed above, Marui teaches that the bottom of the catalyst container is to be water-permeable to allow water to pass therethrough. Claim 42 is thus believed to be patentable.

II. 35 U.S.C. 103(a) Rejections

Claims 7, 12, 14 - 19, 22 - 25, 27 - 30, 33, 34, 36, 38, 40, and 42 were rejected under 35 U.S.C. 103(a) as being unpatentable over German 2904842 (Ger '842) in view of Marui. To establish prima facie obviousness, all claim limitations

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must be taught or suggested. Moreover, a proposed modification cannot render the prior art unsatisfactory for its intended purpose. MPEP 2143.01.

As discussed above, Marui does not teach or suggest a hydrophobic encasement of the container. Thus, this limitation is missing from the proposed combination. Moreover, modifying the teaching of Marui to remove the water-permeable bottom section and make it hydrophobic would render Marui incapable of returning water to the battery (see Marui, column 2, line12-17). Thus the combination Ger' 842 and Marui cannot establish a prima facie case of obviousness for claims 7, 12, 14, 15 - 19, 22-25, 27-30, 33, 34, 36 and 38.

Claim 40, requires means for making all portions of said container that are gas-permeable impermeable to any liquid water. This is contrary to the teachings of Marui which, as discussed above, teaches away from this limitation. Claim 42, is likewise believed patentable as Marui teaches away from a PTFE material that prevents liquid water from passing through the container.

Claim 17, dependent from claim 15, is further limited to the solid film encasing the container being a film of PTFE. This additional limitation is not taught or suggested in Ger '842 or Marui.

Claims 28 to 30, 33 and 34, depending from claim 27, are directed to the cage secured to said body (vent body) for supporting the catalyst container. Neither CL, Ger '842, nor Marui teach or suggest the limitations related to the cage. Thus claims 28 to 30, 33, and 34 are believed to patentable for these additional reasons.

New Claims

Claims 43, 44 and 47, dependant from claims 14, 15, and 42 respectively, are further limited to a film wrapped around the container. This is not taught or suggested in the prior art of record.

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Claim 45, depending from claim 40, is limited to a film which is not taught or suggested in the prior art of record. New claim 46 is further limited to the film being wrapped around the container.

New independent claims 48 and 49 require a gas permeable liquid water barrier comprising solid PTFE attached to said container and positioned to prevent liquid water from passing between said interior of said container and said exterior of said device. As discussed above, neither CL, Ger '842, nor Marui, singularly or in combination, teach or suggest all these limitations and thus new claims 48 and 49 are believed patentable.

CONCLUSION

For the reasons set forth above, claims 7, 12, 14, 15 - 19, 22 - 25, 27 - 30, 33, 34, 36, 38, 40, and 42 to 49 are believed patentable. If any issues remain applicant request an interview prior to the next office action.

Respectfully submitted,

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Date



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

The paragraph beginning on page 1, line 7, has been amended as follows:

--This application is a continuation-in-part of PCT application No. PCT/US97/20445 filed November 12, 1997, which has issued as U.S. Patent No. 6,285,167, and which claims the benefit to U.S. Provisional Application No. 60/030,854, filed November 12, 1996.--

In the Claims:

Claims 8, 9, 20, 21, 32, 35, 37, 39, 41, have been withdrawn.

7. (Twice Amended) A valve regulated lead acid electric cell comprising:
a sealed housing;
a positive electrode positioned in the housing;
a negative electrode positioned in the housing in spaced relationship from the positive electrode;
an electrolyte in said housing in contact with said positive and negative electrodes;
a gas space within said housing;
a pressure relief valve which allows gas to escape from the housing and which prevents oxygen gas from outside the housing to contact said negative electrode;
a gas-permeable catalyst container in gas communication with said gas space, said container comprising a flame arresting material having pores of suitable

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size to permit gas to pass therethrough while being a barrier to a flame, said container being encased in a gas-permeable hydrophobic solid film coating; and
a catalyst arranged in said catalyst container for converting oxygen gas and hydrogen gas which is generated in the housing to water vapor.

14. (Once amended) A cell according to claim 7 wherein ~~said catalyst container comprises a ceramic material and~~ said hydrophobic film coating comprises PTFE.

15. (Once amended) A device for recombining gases in a storage battery; comprising:

a gas-permeable catalyst container, said container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough and which acts as a barrier to a flame;

a catalyst arranged within said container; and

a gas-permeable hydrophobic solid film ~~coating~~ encasing said container.

16. (Once amended) A device in accordance with claim ~~15~~ 17 wherein said flame arrestor comprises a ceramic material.

17. (Once amended) A device in accordance with claim 15 wherein said hydrophobic film ~~coating~~ comprises ~~a film of~~ PTFE.

22. (Twice Amended) A device in accordance with claim 15 wherein said container has an outside diameter of about .6 inches and comprises alumina-porcelain, and said hydrophobic film ~~coating~~ comprises PTFE.

23. (Twice Amended) A device in accordance with claim ~~15~~ 17 wherein said container is cylindrical, ~~and said hydrophobic coating comprises PTFE.~~

27. (Twice Amended) A vent assembly for sealing a VRLA battery cell having a sealed housing and a gas space within said housing, said device comprising:

a vent body through which gas from inside the housing can vent to outside the housing;

a pressure relief valve member within said vent body to allow excess gas to escape from the housing and which prevents gas outside the housing from entering the housing;

a gas-permeable catalyst container supported on said body to be in gas communication with said gas space when said vent assembly seals the battery cell, said catalyst container comprising a flame arresting material having pores of suitable size to permit gas to pass therethrough while being a barrier to a flame, said container being encased in a gas-permeable hydrophobic solid film coating; and

a catalyst arranged in said catalyst container for recombining oxygen gas and hydrogen gas generated in the cell to water vapor.

38. (Once Amended) An assembly in accordance with claim 27 wherein said gas-permeable hydrophobic film coating comprises PTFE.

40. (Once Amended) A device for recombining gases in a storage battery; comprising:

a gas-permeable catalyst container, said container being formed of a flame arresting material having pores of suitable size to permit gas to pass therethrough and which acts as a barrier to a flame;

a catalyst arranged within said container; and

means for making all portions of said container that are gas-permeable impermeable to any liquid water while permitting gas to pass through, said means including PTFE ~~a PTFE gas-permeable hydrophobic encasement of said container.~~

42. (Once Amended) A catalyst device for recombining gases in a storage

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battery; comprising:

a gas-permeable catalyst container, said container being formed of a flame arresting material having pores of suitable size to permit gas to pass therethrough and which acts as a barrier to a flame;

a catalyst arranged within said container; and

a PTFE gas-permeable hydrophobic solid material attached externally to and surrounding said container in a manner so as to prevent liquid water from passing through said container when said device is combined with said storage battery.

43. (New) A device in accordance with claim 14 wherein said film is wrapped around said container.

44. (New) A device in accordance with claim 15 wherein said film is wrapped around said container.

45. (New) A device in accordance with claim 40 wherein said PTFE comprises a film of PTFE.

46. (New) A device in accordance with claim 45 wherein said film is wrapped around said container.

47. (New) A device in accordance with claim 42 wherein said PTFE material is a film wrapped around said container.

48. (New) A device for combining gases within a storage battery; comprising:
a catalyst container having an interior, said container comprising a flame arresting material having pores of suitable size to permit gas to pass between said interior and an exterior of said device and which acts as a barrier to a flame;
a catalyst arranged within said interior, said catalyst capable of reacting oxygen gas and hydrogen gas to form water vapor; and

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a gas permeable liquid water barrier comprising solid PTFE attached to said container and positioned to prevent liquid water from passing between said interior of said container and said exterior of said device.

49. (New) A device in accordance 48 wherein said barrier comprises a film wrapped around said container.

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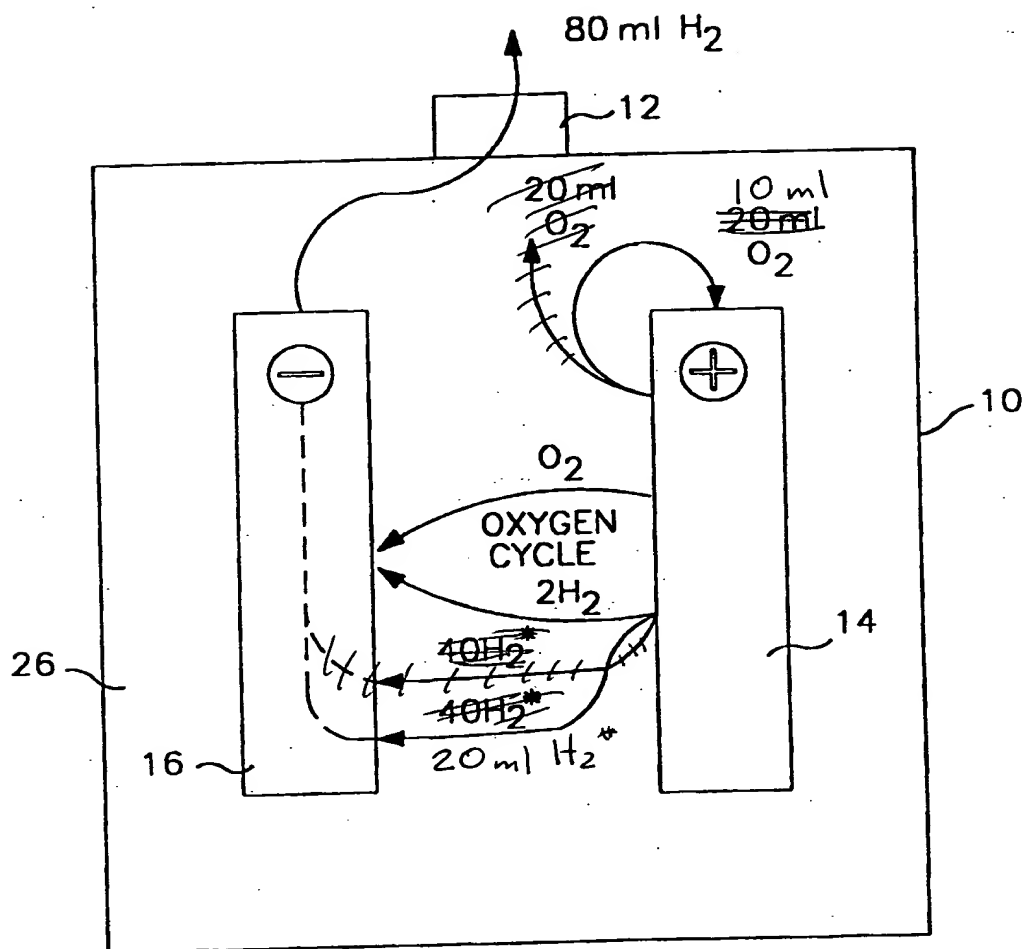


FIG. 3